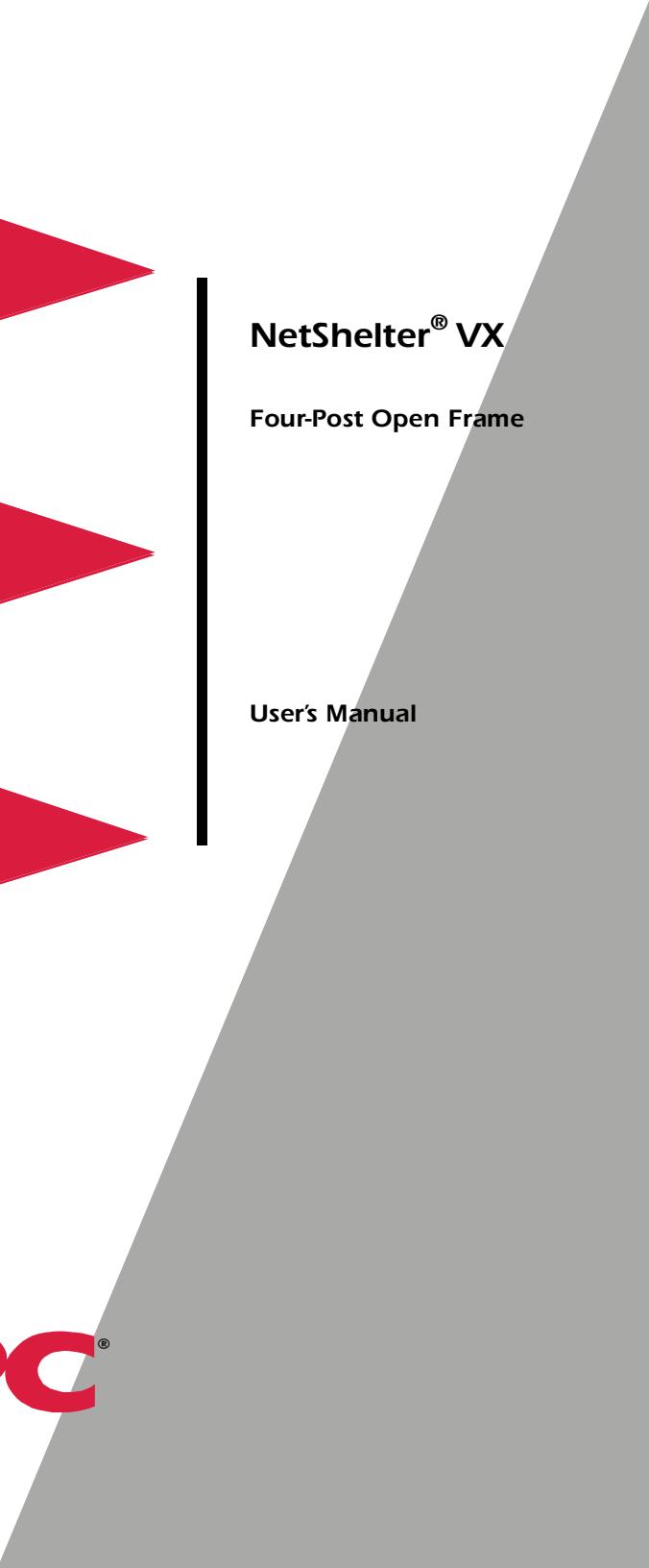


NetShelter[®] VX

Four-Post Open Frame



User's Manual



APC[®]

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Product Overview

This American Power Conversion (APC®) NetShelter® VX Four-Post Open Frame is a high-quality frame for storage of industry-standard (EIA-310) 19-inch rack-mount hardware, which includes servers, voice, data, networking, internetworking, and APC power protection equipment.

NetShelter VX Four-Post Open Frame models

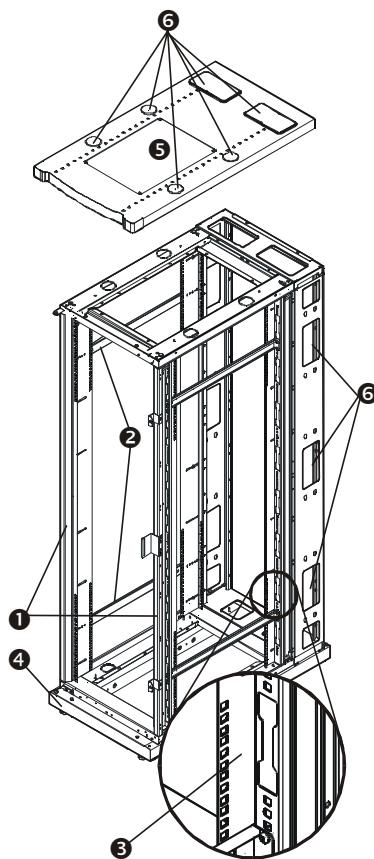
Model	Height	Width	Depth
AR2102 AR2102BLK	42U [†]	19" EIA	1070mm
AR2802 AR2802BLK	42U	19" EIA	900mm

† One U = 1.75 in. (4.44 cm)

Product Inventory

Features of the Enclosure	
Frame	<ul style="list-style-type: none">• 42U (73.5 in) of storage height for 19-inch rack-mount equipment
	<ul style="list-style-type: none">• Frame posts ①
	<ul style="list-style-type: none">• Adjustable horizontal braces ② and vertical mounting rails ③
	<ul style="list-style-type: none">• Front and rear skirts ④
	<ul style="list-style-type: none">• Ground studs on roof and base
	<ul style="list-style-type: none">• Ground studs on rear cabling channel (AR2102BLK only)
Roof	<ul style="list-style-type: none">• Ventilated roof ⑤
Cable access	<ul style="list-style-type: none">• Access on sides (AR2102BLK only), and base ⑥
Feet	<ul style="list-style-type: none">• Removable, heavy-duty casters and removable, adjustable leveling feet

**Features of the
Four-Post Open
Frame**



**Hardware,
grommets, and
covers**

Item	AR2102BLK	AR2802BLK
Baying hardware		
Baying brackets	—	4
Vertical baying trim	—	1
M6 counter-sunk screws	—	4
M6 × 12 socket-head screws	—	8
M6 caged nuts	—	8
Mounting hardware		
M6 × 16mm Phillips/slotted screws	60	60
Caged nut installation tool	1	1
M6 caged nuts	60	60
Plastic cup washers	60	60
Open-ended wrench (13 mm/14 mm)	1	1
M5 Allen wrench	1	1
Covers		
4 × 4" cover	4	3
4 × 4" grommet	4	—
4 × 8" grommet	6	—

Before Installation



Before you begin to unpack the frame, read and follow these warnings to prevent injury and damage:

- Use at least two persons to unpack the frame.
- Stabilize the frame before installing the components—failure to do so could allow the frame to tip over.
- Do not extend more than one component from the frame at one time to prevent the frame from becoming dangerously unstable.
- Load the heaviest components first and place them toward the bottom of the enclosure to prevent the frame from becoming top-heavy.

Location of mounting hardware

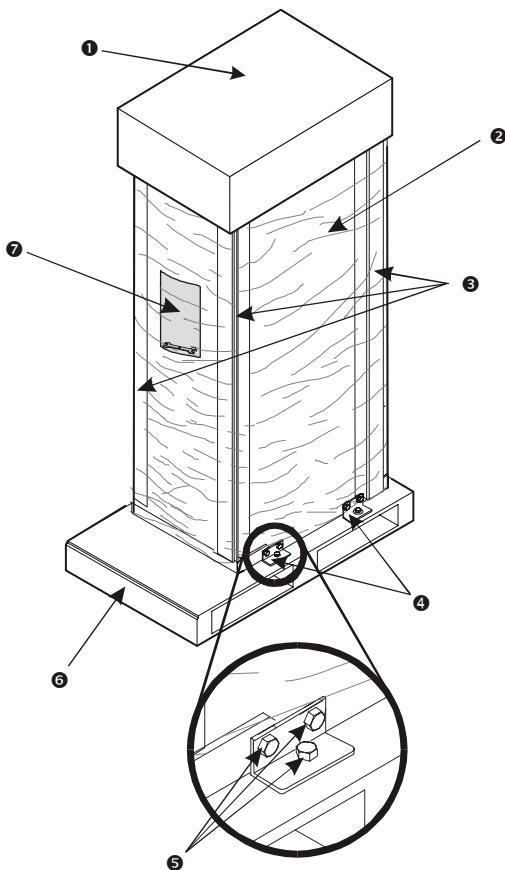
The bag containing the mounting hardware is fastened to the floor of the frame.

Tools required

The following tools (not included) will be necessary to unpack and adjust the frame:

- Phillips screwdriver
- Shears/utility knife
- Level

**Packaging of
the frame**



❶ Cardboard top cover	❷ Stretch wrap
❸ Cardboard corner protectors	❹ Pallet brackets
❽ 13mm bolts	❺ Shipping pallet
❻ Pouch containing the open-ended wrench, this user's manual, warranty card, and literature	

Unpacking the frame

1. Move the shipping pallet to a firm, level surface in an open area. Inspect the frame for visible signs of shipping damage. If you detect shipping damage, contact APC Customer Support at the number listed on the yellow sticker on the front of the frame.
2. Remove the open-ended wrench from the pouch on the front of the packaging.
3. Refer to the label on the packaging to determine where to cut the wrapping. Using heavy-duty shears or a utility knife, carefully remove the plastic stretch-wrap surrounding the frame.
4. Remove the cardboard cover and the four tall, cardboard corner protectors.
5. Remove the four brackets that are anchoring the frame to the shipping pallet. Use the 13-millimeter end of the open-ended wrench (stored inside the pouch on the front of the frame packaging) to remove the 13-millimeter bolts that secure the brackets to the pallet.
6. With one person on each side of the frame, carefully roll it toward the rear of the pallet until the rear casters clear the back edge of the pallet. Continue to slide the frame rearward until the rear casters make contact with the floor.
7. While one person carefully tips the frame slightly away from the pallet, have the other person pull the pallet away from the frame.



Note

Save the pallet if you plan to reship the frame.

Please recycle



The shipping materials are recyclable. Please save them for later use, or dispose of them appropriately.

Disclaimer

APC is not responsible for damage sustained during reshipment of this product.

**Taking
inventory**

After unpacking the frame, verify that all required components and hardware have been shipped with the frame. See the earlier section on product inventory.



Note

If any items are missing, contact APC Customer Support using a number or Web address listed on the back cover of this manual.

Configuration

Before installing your frame, plan the location of the equipment to be installed. Consider the space needed by equipment, ergonomics of keyboards and video monitors.

The NetShelter Configurator, available on the APC Web site, helps you plan your configuration to maximize the available U-space of your frame(s).



Warning

To maintain proper airflow, cover any empty vertical enclosure space with optional blanking panels (AR8101 and AR8101BLK for 19-inch wide enclosures, not included). Improper airflow could damage installed components.

To avoid damage or injury, level and stabilize the enclosure in its permanent location before loading equipment.

Installing the Four-Post Open Frame

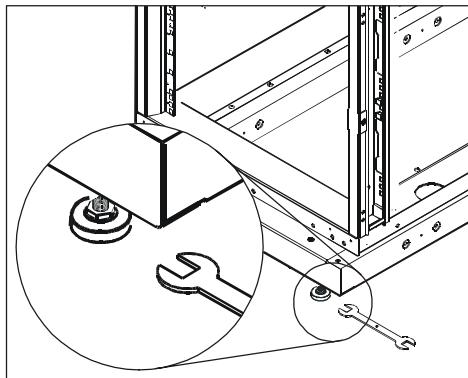
To install the frame, you will first level it. You can also provide additional stability using any of several methods described in this section.

Leveling feet

Leveling feet are attached under the frame at each corner. The leveling feet can help provide a stable base if the selected floor space is uneven, but they are not intended to compensate for a badly sloped surface. You can remove the casters and leveling feet to allow the base of the frame to rest directly on the floor.

How to level the frame

1. Move the frame to a relatively level location.
2. Fit the 14-millimeter end of the open-ended wrench (included) to the hex head just above the round pad on the bottom of the leveling foot. Turn the wrench clockwise to extend the leveling foot until it makes firm contact with the floor.



3. Repeat step 2 for each of the remaining leveling feet.
4. Use a level to determine which feet need further adjustment to level the frame. Adjust as necessary.

**Removing the
casters and
leveling feet
(optional)**

1. Lay the frame on its side.



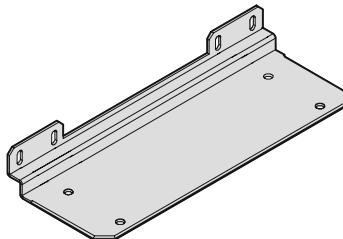
**To avoid personal injury or damage to
the frame, two people should support
the frame.**

2. Remove the four hex nuts from each of the casters and remove the casters.
3. Fit the 14-millimeter end of the open-ended wrench (included) to the hex head just above the round pad on the bottom of the leveling foot. Turn the wrench clockwise to extend the leveling foot until it comes off.
4. Repeat step 3 for each of the remaining leveling feet.

**Stabilizing kits
(optional)**

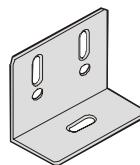
American Power Conversion offers additional products (not included) for stabilizing frame:

- Stabilizer Plate Kit (AR8115 or AR8115BLK)—one plate and mounting hardware for attaching to the frame. Use up to 3 plate kits to provide stability to the front and sides. You can also bolt stabilizer plates to the floor for additional stability.



To use the Stabilizer Plate Kit, you must first remove the front skirt of the frame. See “Removing the skirts” on page 16.

- Bolt-Down Bracket Kit (AR8112BLK)—four brackets and mounting hardware for attaching to the inside or outside of the base of the frame. These brackets must be bolted to the floor to stabilize the frame.



Baying kits

You can expand your installation by joining frames together with optional baying kits (AR8376BLK or AR8377BLK).

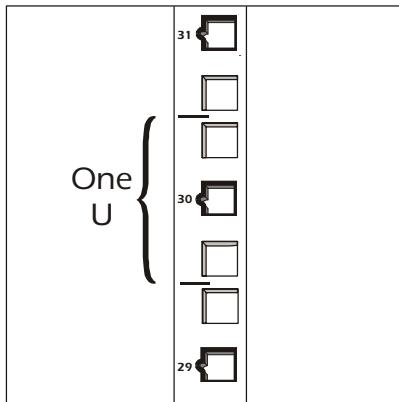


Installing Equipment

This section gives general information on installing rack-mount equipment in the frame. See also the instructions provided with the equipment to be installed.

Identifying one U-space on the mounting rail

When installing equipment, you will need to locate the top and bottom of a U-space on the mounting rails. Every third square hole on the mounting rails of a NetShelter frame is notched and numbered to indicate the middle of a U-space. A U-space consists of one of these notched holes and one hole immediately above and below it, as shown.



Installing and removing caged nuts

During installation of equipment in your frame, you may need to install or remove caged nuts.

To install:



Warning

Install caged nuts horizontally, with the ears engaging the sides of the square hole. Do NOT install caged nuts vertically with the ears engaging the top and bottom of the square hole.

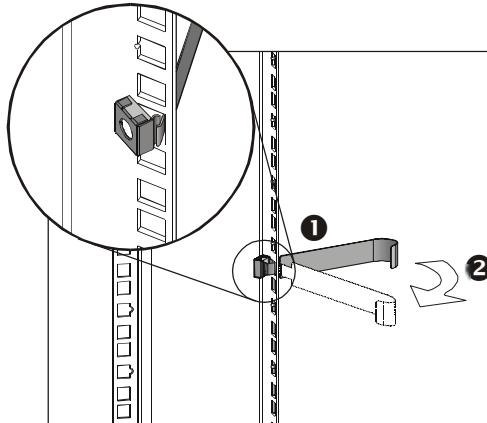
1. Insert the caged nut into the square hole by hooking one ear of the caged nut assembly through the far side of the hole.



Note

Install the caged nuts on the interior of the mounting rails.

2. Place the caged nut tool (included) on the other ear of the caged nut and pull to snap it into position.



To remove: Remove any attached screw and reverse the action in step 2. Grasp the caged nut before releasing the tool.

**Grounding
studs**

There are five grounding studs on the Four-Post Open Frame.

# of studs	Location
4	Base
1	Rear cabling channel (AR2102BLK only)
1	Roof

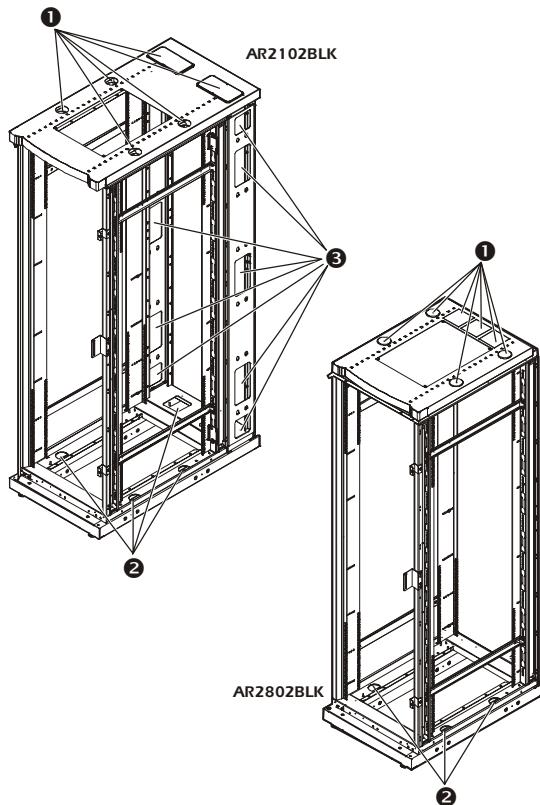
American Power Conversion offers an optional grounding kit (AR8390) for grounding the frame.

Cable Management

Location of cable access openings

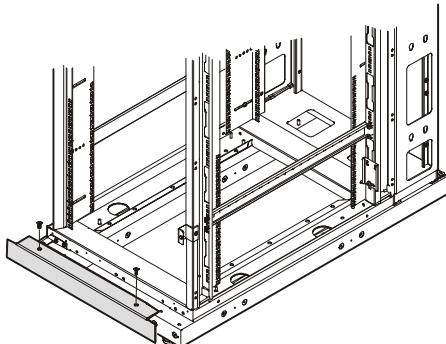
There are cable access openings in the roof **1**, base **2**, and sides **3** (AR2102BLK only) of the enclosure. The rear cabling channel on the back of the AR210BLK model provides clearance for routing cables.

Before routing wires through the side access holes on the Base enclosure, ensure the protective grommets (included) are installed into the cable access openings.



Removing the skirts

For additional cable access or to install the Stabilizer Plate, you can remove the skirts at the front and rear of the frame by removing the two countersunk screws in each skirt.



Cable management options

APC offers the following products for managing cables in your frame:

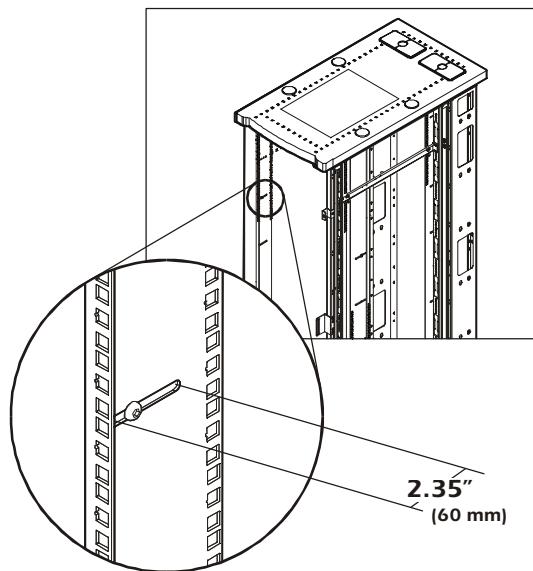
Product	SKU	Description	Figure
Cable Management Hoops	AR8113	Fasten cables to posts, mounting rails, or braces.	
Cable Containment Kit (AR2102BLK only)	AR8116BLK	Fasten cables to rear cabling channel.	
Side Cable Management Tray	AR8114BLK	Fasten cables to posts, mounting rails and braces.	
Rear Cable Management Tray (AR2102BLK only)	AR8118BLK	Fasten cables to rear cabling channel	

Vertical Mounting Rails

The vertical mounting rails are factory-installed in the proper position for use with rack-mountable equipment that has a depth of 29.13 inches (739mm). You can adjust the rails to the front or rear a total of 2.35 inches (60mm) to accommodate different rails or equipment with various depths. You can also move the rails by attaching them to the horizontal braces. The following sections describe the procedures for adjusting the position of the mounting rails and for moving them within the frame.

Location of screws for adjusting the mounting rail

The location of the screws that govern the position of the mounting rails is shown below (AR2102BLK shown).



Adjusting the mounting rails on the frame posts



To avoid personal injury or damage to the frame, perform this procedure with no equipment installed on the vertical mounting rails.

1. Use the 5-millimeter Allen wrench (included) to loosen—but not remove—the socket-head screws in the slot of the vertical mounting rail.
2. Slide the vertical mounting rail forward or rearward as desired. Use a level to make sure the mounting rail is vertical. Tighten each screw.

Repositioning the rails using the horizontal braces

1. Use the 5-millimeter Allen wrench (included) to remove the socket-head screws in the slots of the vertical mounting rail.
2. Locate the new position for the vertical mounting rail.
3. Secure the vertical mounting rail to each horizontal brace.



You may have to adjust the position of the horizontal brace up or down to align it with the mounting channel in the rear mounting rail.



See “How to move a brace” on page 19.

- a. Insert a caged nut into the appropriate holes at the new position on the upper and lower horizontal brace.
- b. Place the mounting rail at the new position and insert a socket-head screw through the rail, brace, and caged nut.
- c. Tighten the screw to secure the vertical mounting rail to the brace.
- d. Repeat steps a-c for the other side.

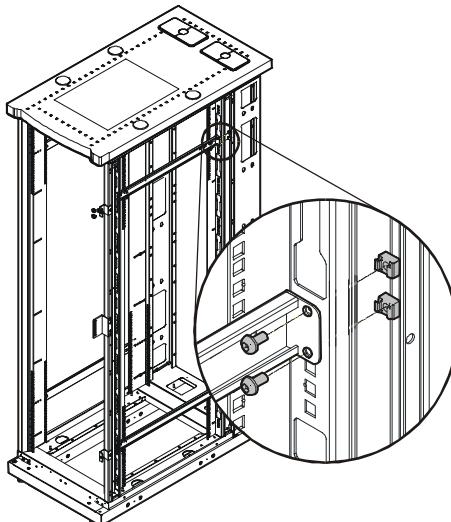
5. Repeat steps 1-3 for the opposite side of the enclosure.

Horizontal Braces

Each side of the frame has two horizontal braces between the vertical frame posts. These adjustable braces support the vertical mounting rails and are available for managing cables.

How to move a brace

1. Use the 5-millimeter Allen wrench (included) to remove the four socket-head screws that are holding the brace to the frame posts (AR2102BLK shown).



2. Remove the caged nuts from the frame post.

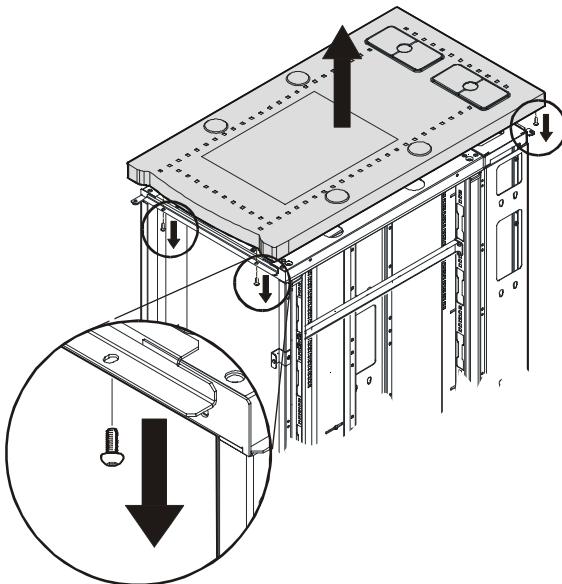


See “Installing and removing caged nuts” on page 13.

3. Locate the new position for the brace and secure the brace to the frame posts:
 - a. Insert a caged nut into the appropriate holes at the new position on the frame posts.
 - b. Place the brace at the new position and insert a socket-head screw through the brace, frame post, and caged nut. Tighten.

Removing the Roof

You can remove the roof from the frame by removing the four socket-head screws from the inside corners. Use the 5-millimeter Allen wrench (included).



Warranty and Service

Limited warranty

APC warrants the Four-Post Open Frame to be free from defects in materials and workmanship for a period of five years from the date of purchase. Its obligation under this warranty is limited to repairing or replacing, at its own sole option, any such defective products. This warranty does not apply to equipment that has been damaged by accident, negligence, or misapplication or has been altered or modified in any way. This warranty applies only to the original purchaser.

Warranty limitations

Except as provided herein, APC makes no warranties, express or implied, including warranties of merchantability and fitness for a particular purpose. Some jurisdictions do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

Except as provided above, in no event will APC be liable for direct, indirect, special, incidental, or consequential damages arising out of the use of this product, even if advised of the possibility of such damage.

Specifically, APC is not liable for any costs, such as lost profits or revenue, loss of equipment, loss of use of equipment, loss of software, loss of data, costs of substitutes, claims by third parties, or otherwise. This warranty gives you specific legal rights and you may also have other rights, which vary according to jurisdiction.

Obtaining service

To obtain support for problems with your Four-Post Open Frame:

1. Note the serial number and date of purchase. (The serial number appears on the top of the frame at rear.)
2. Contact Customer Support at a phone number on the back cover of this document. A technician will try to help you solve the problem by phone.
3. If you must return the product, the technician will give you a return material authorization (RMA) number. If the warranty expired, you will be charged for repair or

replacement.

4. Pack the unit carefully. The warranty does not cover damage sustained in transit. Enclose a letter with your name, address, RMA number and daytime phone number; a copy of the sales receipt; and a check as payment, if applicable.
5. Mark the RMA number clearly on the outside of the shipping carton.
6. Ship by insured, prepaid carrier to the address provided by the Customer Support technician.

Specifications

Item	Measurement	
	AR2102BLK	AR2802BLK
Height	81.5 in (207cm)	81.5 in (207cm)
Width	23.0 in (58.5cm)	23.0 in (58.5cm)
Depth	42.2 in (107.4cm)	35.5 in (90.1cm)
Net weight	217 lb (98.4kg)	163 lb (73.9kg)



APC Worldwide Customer Support

Customer support for this or any other APC product is available at no charge in any of the following ways:

- Visit the APC Web site to find answers to frequently asked questions (FAQs), to access documents in the APC Knowledge Base, and to submit customer support requests.
 - **www.apc.com** (Corporate Headquarters)
Connect to localized APC Web sites for specific countries, each of which provides customer support information.
 - **www.apc.com/support/**
Global support with FAQs, knowledge base, and e-support.
- Contact an APC Customer Support center by telephone or e-mail.
 - Regional centers:

APC headquarters U.S., Canada	(1)(800)800-4272 (toll free)
Latin America	(1)(401)789-5735 (USA)
Europe, Middle East, Africa	(353)(91)702020 (Ireland)
Japan	(03)5434-2021 Guidance 3

- Local, country-specific centers: go to **www.apc.com/support/contact** for contact information.

Contact the APC representative or other distributor from whom you purchased your APC product for information on how to obtain local customer support.

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